4. A process for producing compacted graphite cast iron castings or spheroidal graphite cast iron castings from a molten cast iron having an eutectic or close to eutectic composition, comprising the steps of:

a) providing molten cast iron having an eutectic or close to eutectic composition;

b) determining the amount of structure-modifying agent that has to be added to a certain cast iron melt in order to obtain compacted graphite cast iron or spheroidal graphite cast iron according to the method of either claim 1 or claim 3;

c) adding the amount of structure-modifying agent determined in step b) to the molten cast iron; and

d) carrying out the casting operation in a per se known manner.

5. An apparatus for establishing, in real time, an amount of a structure-modifying agent ~~to~~ be added to a hypo-eutectic or near-eutectic cast iron melt during the process of producing a compacted graphite iron casting;

the apparatus comprising:

a first temperature sensor (10) for recording a cooling curve in the centre of a sample vessel;

a second temperature sensor (12) for recording a cooling curve in the vicinity of the sample vessel wall;

a computer device (14) for determining an amount value (Va) of a structure modifying agent to be added to the melt;

a memory means (16) which is provided with pre-recorded calibration data;

the computer being set up to determine the heat generated in the centre of the sample as a function of time (a heat generation curve) by applying

i) the thermal balance formula:

$$Q_{stored} = Q_{generated} + Q_{in} - Q_{out}$$

where Q_{stored} is the amount of heat stored by the heat capacity of the material, $Q_{generated}$ is the amount of heat generated by the volume of material, Q_{in} is the heat transferred into the material from its surroundings and Q_{out} is the heat transferred to the surroundings; and

ii) the cooling curves recorded by said first and second temperature sensors (10, 12);

the computer being set up to identify a time value t_p, corresponding to a local maximum of the heat generated in the centre of the sample as a function of time;

the computer being set up to calculate the maximum value of the first time derivative of the cooling curve recorded by the first temperature sensor (10) and to assign this value to the variable α and to assign the corresponding time to the variable t_α;

the computer being set up to compare time values t_p and t_α, and

if t_α - t_p is less than a threshold value tv

the computer being set up to identify a new first derivative value α, located at a time value $t_{\alpha 1}$, which is larger than t_α, and which corresponds to a part of the cooling curve recorded by the first temperature sensor (10) where the second time derivative is approximately 0 and to assign this new first derivative value to the variable α;

the computer being set up to determine an amount value (Va) of a structure modifying agent to be added to the melt by using the first derivative value α and pre-recorded calibration data.

6. A computer program product for use in an apparatus for establishing, in real time, an amount of a structure-modifying agent to be added to a cast iron melt (20) during the process of producing a compacted graphite iron casting;

wherein the apparatus has

a first temperature sensor (10) for recording a cooling curve in the centre of a sample vessel;

a second temperature sensor (12) for recording a cooling curve in the vicinity of the sample vessel wall;

a computer device (14) for determining an amount value (Va) of a structure modifying agent to be added to the melt;

a memory means (16) which is provided with pre-recorded calibration data;

the computer program product comprising:

a recording medium and a computer-readable code means for directing the computer device to determine the heat generated in the centre of the sample as a function of time (a heat generation curve) by applying

i) the thermal balance formula:

$$Q_{stored} = Q_{generated} + Q_{in} - Q_{out}$$

where Q_{stored} is the amount of heat stored by the heat capacity of the material, $Q_{generated}$ is the amount of heat generated by the volume of material, Q_{in} is the heat transferred into the material from its surroundings and Q_{out} is the heat transferred to the surroundings; and the cooling curves recorded by said first and second temperature sensors (10, 12);

a recording medium and a computer-readable code means for directing the computer device to identify a time value t_p, corresponding to a local maximum of the heat generated in the centre of the sample as a function of time;

a recording medium and a computer-readable code means for directing the computer device to calculate the maximum value of the first time derivative of the cooling curve recorded by the first temperature sensor (10) and to assign this value to the variable α and to assign the corresponding time to the variable t_α;

a recording medium and a computer-readable code means for directing the computer device to compare time values t_p and t_α, and

if $t_\alpha - t_p$ is less than a threshold value tv

to identify a new first derivative value α, located at a time value $t_{\alpha 1}$, which is larger than t_α, and which corresponds to a part of the cooling curve recorded by the first tem-